

CLAIMS

What is Claimed is:

1. A leadframe comprising:
 - 5 an outer frame with a plurality of sides surrounding a region of the leadframe on which a semiconductor chip is to be mounted;
 - a die pad on which the semiconductor chip is to be mounted; and
 - 10 a plurality of leads each having land portions and connections, the land portions each having an upper surface serving as a bonding pad to be connected with a metal wiring and a lowermost part serving as an external terminal, the connections each being devoid of its lower part so as to be thinner than the land portion and being provided between the outer frame and the land portions, between the land portions associated with each other in each lead, and between the land portions and the die pad,
 - 15 wherein there exists no member that functions as a suspension lead during plastic encapsulation.

2. The leadframe according to Claim 1,
 - wherein the lowermost parts of the land portions are substantially identical in shape in plan view and are arranged in a lattice pattern.

- 20 3. The leadframe according to Claim 1,
 - wherein three or more rows of the lowermost parts of the land portions are arranged along each side of the outer frame.

- 25 4. The leadframe according to Claim 1,

wherein the plurality of leads include a lead that is connected to one side of the outer frame and is connected to the other lead that is connected to the other side of the outer frame adjacent to the one side thereof.

5 5. A leadframe comprising:

an outer frame with a plurality of sides surrounding a region of the leadframe on which a semiconductor chip is to be mounted;

a die pad having a thin portion that is provided along the peripheral section of the main body of the die pad and that is devoid of its lower part, and a plurality of heat 10 dissipating terminals each protruded downward from the lower surface of the thin portion; and

15 a plurality of leads each having land portions and connections, the land portions each having an upper surface serving as a bonding pad to be connected with a metal wiring and a lowermost part serving as an external terminal, the connections each being devoid of its lower part so as to be thinner than the land portion and being provided between the outer frame and the land portions, between the land portions associated with each other in each lead, and between the land portions and the heat dissipating terminals.

6. The leadframe according to Claim 5,

20 wherein the land portions and the heat dissipating terminals are substantially identical in shape in plan view and are arranged in a lattice pattern.

7. The leadframe according to Claim 5,

25 wherein the land portions and the heat dissipating terminals are arranged at substantially fixed pitch intervals in at least one direction.

8. The leadframe according to Claim 5,
wherein three or more rows of the land portions are arranged along each side of the
outer frame.

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9. The leadframe according to Claim 5,
wherein there exists no member that functions as a suspension lead during plastic
encapsulation.

10 10. A plastic-encapsulated semiconductor device comprising:
a die pad;
a semiconductor chip mounted on the die pad;
land portions each detached from the die pad and each having an upper surface
serving as a bonding pad to be connected with a metal wiring and a lowermost part serving
15 as an external terminal;
a plurality of connecting members through which portions of the semiconductor
chip are connected to the bonding pads; and
a plastic encapsulant for encapsulating the semiconductor chip, the connecting
members, the land portions and the die pad, with the lowermost parts of the land portions
20 and at least a part of the bottom surface of the die pad exposed,
wherein the semiconductor device is provided with no member that extends from
the die pad and that has its end exposed at a surface of the plastic encapsulant.

25 11. The semiconductor device according to Claim 10,
wherein the external terminals are substantially identical in shape in plan view and

are arranged in a lattice pattern at the bottom surface of the plastic encapsulant.

12. The semiconductor device according to Claim 10,

wherein three or more rows of the external terminals are arranged at the bottom

5 surface of the plastic encapsulant along the peripheral region thereof.

13. A plastic-encapsulated semiconductor device comprising:

a die pad having a thin portion that is provided along the peripheral section of the

main body of the die pad and that is devoid of its lower part, and a plurality of heat

10 dissipating terminals each protruded downward from the lower surface of the thin portion;

a semiconductor chip mounted on the main body of the die pad;

land portions each detached from the die pad and each having an upper surface

serving as a bonding pad to be connected with a metal wiring and a lowermost part serving

as an external terminal;

15 a plurality of connecting members through which portions of the semiconductor
chip are connected to the bonding pads; and

a plastic encapsulant for encapsulating the semiconductor chip, the connecting
members, the land portions, the heat dissipating terminals and the die pad, with the
lowermost parts of the land portions and the lowermost parts of the heat dissipating

20 terminals exposed.

14. The semiconductor device according to Claim 13,

wherein the external terminals and the heat dissipating terminals are substantially

identical in shape in plan view and are arranged in a lattice pattern at the bottom surface of

25 the plastic encapsulant.

15. The semiconductor device according to Claim 13,
wherein the external terminals and the heat dissipating terminals are arranged at
substantially fixed pitch intervals in at least one direction.

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16. The semiconductor device according to Claim 13,
wherein three or more rows of the external terminals are arranged at the bottom
surface of the plastic encapsulant along the peripheral region thereof.

10 17. The semiconductor device according to Claim 13,
wherein the semiconductor device is provided with no member that extends from
the die pad and that has its end exposed at a surface of the plastic encapsulant.

15 18. A method for fabricating a plastic-encapsulated semiconductor device, the
method comprising the steps of:

20 a) preparing a leadframe comprising an outer frame with a plurality of sides
surrounding a region of the leadframe on which a semiconductor chip is to be mounted, a
die pad on which the semiconductor chip is to be mounted, and a plurality of leads each
having land portions and connections, the land portions each having an upper surface
serving as a bonding pad to be connected with a metal wiring and a lowermost part serving
as an external terminal, the connections each being devoid of its lower part so as to be
thinner than the land portion and being provided between the outer frame and the land
portions, between the land portions associated with each other in each lead and between
the land portions and the die pad, wherein the plurality of leads include no member that
25 functions as a suspension lead during plastic encapsulation;

b) mounting the semiconductor chip on the die pad of the leadframe;

c) placing the leadframe on an adhesive sheet for encapsulation;

d) cutting the connections with the leadframe placed on the encapsulation sheet,
thus detaching, from the outer frame, the isolated land portions and the die pad;

5 e) connecting, through a connecting member, a portion of the semiconductor chip
to the associated bonding pad; and

f) carrying out plastic encapsulation with the leadframe placed on the
encapsulation sheet,

wherein the step c) is carried out prior to or subsequent to the step b), and the
10 steps d), e) and f) are carried out in this order after the step c) has been carried out.

19. The method according to Claim 18,

wherein after the step f) has been carried out, there exists no member that is
connected to the die pad and that has its end exposed at a surface of the plastic encapsulant.

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20. The method according to Claim 18,

wherein the plurality of leads of the leadframe prepared in the step a) include a
lead that is connected to one side of the outer frame and is connected to the other lead that is
connected to the other side of the outer frame adjacent to the one side thereof.

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21. A method for fabricating a plastic-encapsulated semiconductor device, the
method comprising the steps of:

a) preparing a leadframe comprising an outer frame with a plurality of sides
surrounding a region of the leadframe on which a semiconductor chip is to be mounted, a
25 die pad having a thin portion that is provided along the peripheral section of the main body

of the die pad and that is devoid of its lower part and having a plurality of heat dissipating terminals each protruded downward from the lower surface of the thin portion, and a plurality of leads each having land portions and connections, the land portions each having an upper surface serving as a bonding pad to be connected with a metal wiring and a 5 lowermost part serving as an external terminal, the connections each being devoid of its lower part so as to be thinner than the land portion and being provided between the outer frame and the land portions, between the land portions associated with each other in each lead, and between the land portions and the heat dissipating terminals;

10 b) mounting the semiconductor chip on the die pad of the leadframe;

 c) placing the leadframe on an adhesive sheet for encapsulation;

 d) cutting the connections with the leadframe placed on the encapsulation sheet, thus detaching the isolated land portions from the outer frame;

 e) connecting, through a connecting member, a portion of the semiconductor chip to the associated bonding pad; and

15 f) carrying out plastic encapsulation with the leadframe placed on the encapsulation sheet,

 wherein the step c) is carried out prior to or subsequent to the step b), and the steps d), e) and f) are carried out in this order after the step c) has been carried out.

20 22. The method according to Claim 21,

 wherein in the step a), the leadframe prepared is provided with no member that functions as a suspension lead during the plastic encapsulation, and

 wherein in the step d), the die pad is also detached from the outer frame.

25 23. The method according to Claim 21,

wherein the plurality of leads of the leadframe prepared in the step a) include a lead that is connected to one side of the outer frame and is connected to the other lead that is connected to the other side of the outer frame adjacent to the one side thereof.